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LETTER TO THE EDITOR

Letter to the editor regarding "effect of pulmonary rehabilitation in patients with chronic obstructive pulmonary disease: a systematic review and meta-analysis"

We read with great interest the article by Zhang et al. [1] published in the latest issue of *Annals of Medicine*; the authors conducted a systematic review and meta-analysis to investigate the efficacy of pulmonary rehabilitation in chronic obstructive pulmonary disease (COPD) patients. Although the study results are encouraging, we would like to highlight some issues that should be considered in the future interpretation of this result.

First, pulmonary rehabilitation is mentioned in many guidelines as a critical component of treatment for patients with COPD. On the contrary, the authors state in the *Introduction* that "previous meta-analysis did not include tai chi or yoga," which is incorrect. Incorporating tai chi or yoga into pulmonary rehabilitation programs has been confirmed in several systematic reviews and meta-analyses. For example, Gendron's "Active mind-body movement therapies as an adjunct to or in comparison with pulmonary rehabilitation for people with chronic obstructive disease" [2], published in *Cochrane Database of Systematic Reviews* and the systematic review by Wu et al. published in 2014 [3].

Second, the purpose of the study was to evaluate the impact of pulmonary rehabilitation on patients with COPD. Indeed, according to the 2013 American Thoracic Society/European Respiratory Society statement, pulmonary rehabilitation refers to "a comprehensive intervention based on a thorough patient assessment, followed by patient-tailored therapies that include but are not limited to, exercise training, education, and behavioural change designed to improve the physical and psychological conditions of people with chronic respiratory disease and promote the long-term adherence to health-enhancing behaviors" [4]. However, according to the original search strategy, the authors seem to have tacitly assumed that pulmonary rehabilitation includes only exercise training. Based on this description, do we think the title "Effect of exercise-based pulmonary rehabilitation in COPD patients" is more appropriate?

Third, meta-analysis pools different studies into one analysis, which inevitably has heterogeneity and cannot be avoided, and high heterogeneity may reduce the credibility of the conclusions. However, we note that the results of the primary meta-analysis showed considerable heterogeneity (i.e. $I^2 > 75\%$ [5]). Interestingly, the heterogeneity of subgroup analyses based on different exercise types was substantially reduced. From potential factors, the inclusion of studies was sufficient for authors to conduct further meta-regression, explore the sources of heterogeneity, and then discuss in-depth or removed studies that caused higher heterogeneity.

In addition, the study was not registered on an international platform (e.g. International Prospective Register of Systematic Reviews), which could create potential bias, such as selective outcome reporting bias. Overall, the authors' findings provide further insight into pulmonary rehabilitation, and in addition to conventional exercise, tai chi and yoga-based qigong exercise may be more helpful for pulmonary function in COPD patients. Considering the issue of heterogeneity, future research on this area needs to be improved.

Author contributions

Hui Wang drafted the original manuscript and revised it by Fan Zhang. All authors agree to be accountable for all aspects of the work.

Disclosure statement

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References

[1] Zhang H, Hu D, Xu Y, et al. Effect of pulmonary rehabilitation in patients with chronic obstructive pulmonary disease: a systematic review and meta-analysis of randomized controlled trials. Ann Med. 2022;54(1):262–273.
[2] Gendron LM, Nyberg A, Saey D, et al. Active mind-body movement therapies as an adjunct to or in comparison with pulmonary rehabilitation for people with chronic obstructive pulmonary disease. Cochrane Database Syst Rev. 2018;10(10):CD012290.
[3] Wu W, Liu X, Wang L, et al. Effects of tai chi on exercise capacity and health-related quality of life in patients with chronic obstructive pulmonary disease: a systematic review and meta-analysis. Int J Chron Obstruct Pulmon Dis. 2014;9:1253–1263.
[4] Spruit MA, Singh SJ, Garvey C, et al. An official American Thoracic Society/European Respiratory Society statement: key

concepts and advances in pulmonary rehabilitation. Am J Respir Crit Care Med. 2013;188(8):e13–e64.
[5] Cochrane Handbook for Systematic Reviews of Interventions version 6.2. [updated February 2021]. https://training.cochrane.org/handbook/current/chapter-10.

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